

CLAIMS

- [1] An image forming apparatus, comprising:
- an endless belt for forming a loop-shaped moving path,
- 5 stretched out between a driving roller and a driven roller which are affixed to positions inside the apparatus;
- a plurality of image bearing members provided in a row within a prescribed range along a moving direction of the endless belt;
- 10 a plurality of image transferring members disposed within the moving path, and respectively opposed to the image bearing members across the endless belt;
- an image transferring member supporting mechanism for approximating and separating the image transferring members to
- 15 and from the image bearing members; and
- a belt supporting mechanism for contacting and separating to the endless belt to and from the image bearing members in accompaniment of an operation of the image transferring member supporting mechanism.
- 20 [2] The image forming apparatus according to claim 1, wherein the image bearing members is made up of a plurality of image bearing members for color images on which are formed toner images of three subtractive primary colors during full color image formation, and an image bearing member for monochrome images on which is formed a black toner image during monochrome image formation,
- the image transferring member supporting mechanism includes a color image moving member for moving as a unit all

image transferring members opposed to the image bearing members for color images, and

the belt supporting mechanism includes a color image supporting member for contacting and separating the endless belt
5 to and from the image bearing members for color images in accordance with operation of the color image moving member.

[3] The image forming apparatus according to claim 2,

wherein the image transferring member supporting mechanism further includes a monochrome image moving member for moving
10 an image transferring member opposed to the image bearing member for monochrome images, and

the belt supporting mechanism further includes a monochrome image supporting member for contacting and separating the endless belt to and from the image bearing member for monochrome images
15 in accordance with operation of the monochrome image moving member.

[4] The image forming apparatus according to claim 1, wherein the image transferring member supporting mechanism and the belt supporting mechanism are disposed within the moving path.

20 [5] The image forming apparatus according to claim 4, wherein the belt supporting mechanism is rotatably supported and includes a first eccentric cam whose circumferential surface abuts an inner circumferential surface of the endless belt.

[6] The image forming apparatus according to claim 4, wherein
25 the image transferring member supporting mechanism includes a second eccentric cam disposed coaxially with the first eccentric cam, a cam follower that is displaced engaged with a circumferential surface of the second eccentric cam, and a

transmitting member for causing the image transferring members to approach to and separate from the image bearing members in accordance with the displacement of the cam follower.

[7] The image forming apparatus according to claim 4, wherein
5 the circumferential surface of the first eccentric cam abuts an inner circumferential surface of the endless belt outside the prescribed range in the moving path.

[8] The image forming apparatus according to claim 4, wherein
the circumferential surface of the first eccentric cam abuts
10 approximately all areas of the endless belt in a width direction.

[9] The image forming apparatus according to claim 8, wherein a diameter of a central portion of the first eccentric cam in the axis direction is larger than diameter at either end portion.

[10] The image forming apparatus according to claim 6, wherein
15 the cam follower includes a first holding portion for holding the image transferring members close to the image bearing members and a second holding portion for holding the image transferring members away from the image bearing members, the first holding portion and the second holding portion being aligned along the
20 direction of arrangement of the image transferring members, and the cam follower is displaced in the direction of the arrangement of the image transferring members in conjunction with rotation of the second eccentric cam.

[11] An image forming apparatus, comprising:

25 an endless belt for forming a loop-shaped moving path, stretched out between a driving roller and a driven roller which are affixed to positions inside the apparatus;

a plurality of image bearing members provided in a row

within a prescribed range along a moving direction of the endless belt, including a plurality of image bearing members for color images on which are formed toner images of three subtractive primary colors during full color image formation and an image bearing member for monochrome images on which is formed a black toner image during monochrome image formation;

5 a plurality of image transferring members disposed within the moving path, and respectively opposed to the image bearing members across the endless belt;

10 an image transferring member supporting mechanism for approximating and separating the image transferring members to and from the image bearing members; and

15 a belt supporting mechanism for contacting and separating the endless belt to and from the image bearing members in accompaniment of an operation of the image transferring member supporting mechanism,

wherein the moving path of the endless belt is made one of a first through a third path according to the type of image forming operation.

20 [12] The image forming apparatus according to claim 11, wherein the first path is a path for when an image forming operation is in standby, in which the endless belt is separated from all the image bearing members.

[13] The image forming apparatus according to claim 11,
25 wherein the second path is a path during full color image formation, in which the endless belt contacts all the image bearing members, and

the third path is a path during monochrome image formation,

in which the endless belt contacts the image bearing member for monochrome images and is separated from the image bearing members for full color images.

[14] The image forming apparatus according to claim 11, wherein
5 the belt supporting mechanism keeps the circumferential length of the endless belt constant in the first through third paths.

[15] An image forming apparatus, comprising:

an endless belt for forming a loop-shaped moving path, stretched out between a driving roller and a driven roller which
10 are affixed to positions inside the apparatus;

a plurality of image bearing members provided in a row within a prescribed range along a moving direction of the endless belt;

15 a plurality of image transferring members disposed within the moving path, and respectively opposed to the image bearing members across the endless belt;

an eccentric cam for rotating at a rotating angle according to the type of image forming operation around a rotating shaft parallel to rotating shafts of the driving roller and the driven
20 roller;

an image transferring member supporting mechanism for converting a change in radius at a specific rotating angle of the eccentric cam to a displacement in a contacting/separating direction with respect to the image bearing members of the image
25 transferring members; and

a tension member, latched to the image transferring member supporting mechanism, for deforming the moving path of the endless belt by, moving in response to an operation of the image

transferring member supporting mechanism.

[16] The image forming apparatus according to claim 15, wherein the image bearing members are made up of a plurality of image bearing members for color images on which are formed toner images of three subtractive primary colors during full color image formation and an image bearing member for monochrome images on which is formed a black toner image during monochrome image formation, and

the image transferring member supporting mechanism is latched to the tension member and including a color image moving member for moving as a unit all image transferring members opposed to the image bearing members for color images.

[17] The image forming apparatus according to claim 16, wherein the image transferring member supporting mechanism further includes a monochrome image moving member for moving an image transferring member opposed to the image bearing member for monochrome images.

[18] The image forming apparatus according to claim 15, wherein the image transferring member supporting mechanism and the tension member are disposed within the moving path.

[19] The image forming apparatus according to claim 18, wherein the image transferring member supporting mechanism includes an abutting portion for abutting a circumferential surface of the eccentric cam at the specific rotating angle position, and the tension member abuts at one end portion an inner circumferential surface of the endless belt and is swingable at another end portion, and is latched to the image transferring member supporting mechanism via an elastic member.

- [20] The image forming apparatus according to claim 18, wherein
the tension member supports, by a rotating shaft parallel to
rotating shafts of the driving roller and the driven roller,
a roller whose circumferential surface abuts an inner
5 circumferential surface of the endless belt and whose diameter
in a central portion in an axis direction is larger than diameters
at either end portion.
- [21] The image forming apparatus according to claim 16, wherein
the tension member, moving in response to the image transferring
10 member supporting mechanism, makes a moving path of the endless
belt one of a first through a third path according to type of
image forming operation.
- [22] The image forming apparatus according to claim 21, wherein
the first path is a path for when an image forming operation
15 is in standby, in which the endless belt is separated from all
the image bearing members.
- [23] The image forming apparatus according to claim 21,
wherein the second path is a path during full color image
formation, in which the endless belt contacts all the image bearing
20 members, and
the third path is a path during monochrome image formation,
in which the endless belt contacts the image bearing member for
monochrome images and is separated from the image bearing members
for full color images.
- 25 [24] The image forming apparatus according to claim 21, wherein
the tension member tenses with a predetermined tensile force
the endless belt at least the second and the third paths.
- [25] The image forming apparatus according to claim 1, wherein

the endless belt is an intermediate image transferring belt to which are sequentially transferred toner images formed on the image bearing members.

[26] The image forming apparatus according to claim 15, wherein
5 the endless belt is an intermediate image transferring belt to which are sequentially transferred toner images formed on the image bearing members.